

National Assessment of Oil and Gas Resources

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[Schedule](#)

Project overview

The overall goal of the National Assessment of Oil and Gas Project is to assess the natural gas endowment and the reserve growth potential of the United States, exclusive of Federal waters (assessed by MMS) to attempt to answer the following question: can the U.S. resource base sustain a production capacity of 30-36 TCFG per year by the year 2020?. As the U.S. moves to an energy mix more dominated by natural gas, questions have been raised as to the ability of domestic production to expand from its current 18 TCFG per year to 30-36 TCFG per year. Our focus is to define and assess both conventional and continuous (unconventional, including coal bed gas) natural gas in the 25 priority basins that are estimated to contain 90-95% of the discovered and undiscovered resources in the U.S. A major effort is to determine the amount of natural gas resource under Federal lands as required in the EPCA Law of 2000. A considerable amount of time is devoted to responding to requests for oil and gas information from Congressional and private entities.

Project objectives and strategy:

The main objectives of this project are to assess and forecast the natural gas endowment of the United States, and to assess the potential for reserve growth in the United States. The approach is to 1) prioritize areas and commodities to be assessed, 2) define total petroleum systems in priority provinces, 3) define assessment plays within these petroleum systems, 4) assess the plays using established methodologies, and 5) forecast the availability of undiscovered resources, including resources under Federal lands. Using several parameters resulting from the 1995 USGS National Oil and Gas Assessment, we determined that about 25 provinces contain 90-95% of the known and undiscovered hydrocarbon resources in the United States. The major focus of the project is to define total petroleum systems in these priority provinces, as this will form the geologic basis for the assessment of all gas resources, including

conventional, continuous (unconventional), and coal bed gas. The total petroleum system represents an approach that integrates all geologic and geochemical studies, including hydrocarbon source rock studies, migration, timing, reservoirs, sequence stratigraphy, structural development and trapping, and as such brings together many elements within the Energy Program. Total petroleum systems are being defined in several priority provinces each year, and assessments occur and are published as an ongoing activity. Total petroleum system and play definition in some of the larger regions such as the Gulf Coast and Alaska will span three or more years. We are using established methodologies to assess both conventional and continuous gas resources. We are using the same assessment methodology for conventional plays that was used in the USGS World Energy Project, and this will be the first assessment where the assessment results from U.S. provinces can be directly compared to foreign areas. For unconventional plays such as continuous gas and coal bed gas we will use a modified cell-based methodology originally developed during the 1995 USGS Assessment. Estimates will be made of resources under Federal lands in all priority provinces. Estimates of the potential for reserve growth will be made on a national level, and then at the regional level. We are also completing, and planning for, several “focused” assessments, whereby other Federal agencies have asked us to assess a certain parcel of Federal land.

The assessment of the distribution, recoverability, and availability of oil and gas resources represent one of the cornerstones of the Energy Program. These issues are vital to the understanding of both domestic economic security, and the role of the U.S. in the international energy scene. Domestically, the pressure to recover resources from lands that historically have been set aside from exploration is increasing. One of the main goals is to produce assessments and forecasts of resources occurring under Federal lands, as we are asked questions by other Federal agencies related to the distribution and quantity of oil and gas occurring on Federal lands. Our digital compilation of total petroleum systems, assessment plays, and assessment results will allow us to answer these questions. The use of an identical methodology for conventional resources with the World Energy Project means that undiscovered U.S. resources can be put in context with the international energy scene for the first time. The total petroleum system documentation and the assessments of gas resources will be released as web products so that the results of the assessments will be released as rapidly as possible. The results of the “focused” assessments are released to the cooperating agency by established deadlines, and then these assessments are released via the web. These focused assessments, such as the one recently completed for Big Cypress National Preserve in Florida, are critical for the Resource Management Plans for the NPS.

TASK 1. Coordination, Methodology, and Focused Assessments

Task Leader: Christopher J. Schenk

Task Summary and Objectives

The purpose of Task 1 is 1) to provide for the coordination of the various tasks within the National Assessment, including Reserve Growth (Task 2), Greater Green River Basin (Task 3), Appalachian Basin (Task 4), San Juan Basin (Task 5), Permian Basin (Task 6), San Joaquin Basin (Task 7), and Fluid Modeling (Task 8), and the separate projects related to the national Assessment such as the Gulf Coast Framework and Alaska Petroleum Studies, 2) to develop, test, establish, enforce, and maintain assessment methodologies for use in assessing undiscovered resources and reserve growth for the National Assessment, and 3) to provide for a team that is responsible for the “focused assessments” of parcels of land done in cooperation with other Federal agencies such as the National Park Service. The task leaders will work with the Project Chief on the scheduling of assessments in priority provinces, and the work required prior to an assessment. The methodology team will develop, enforce, and maintain methodologies used to generate the official assessment numbers. This team will also serve as the official review team for all assessments completed under this project. The Assessment Review Team is responsible for assessing parcels of land of interest to other Federal agencies.

Statement of Work

For FY2000 and FY2001, the coordination effort centers on the the following tasks and topical areas: Gulf Coast, Alaska, Greater Green River Basin, Appalachian Basin, San Juan Basin, Permian Basin, San Joaquin Basin, Fluid Modeling, and Reserve Growth. The task leaders work with the project chief on the scheduling of assessments and on the geologic information required prior to the assessments. The main goal is to see that the geologic-based assessments are scientifically sound, are externally reviewed, and are delivered on schedule. The Methodology Team has the goal of maintaining and enforcing the use of the methodologies for assessing conventional and continuous plays, richness-factor allocations for focused assessments, and the methodology for reserve growth. Another significant aspect of the work will be to oversee the geologic definition and development of petroleum systems and plays in priority provinces.

TASK 2: Reserve Growth in the United States

Task Leader: Ted Dyman

Task summary and Objectives

This task investigates the phenomenon of reserve growth (the growth of reserves in existing oil and gas fields through time) in the United States. The growth of reserves in existing oil and gas fields has been estimated to be more significant in the United States than estimated volumes of undiscovered resources in new field discoveries. Knowledge of the geologic, engineering, and other factors controlling reserve growth is critical if we are to forecast the role of reserve growth in the future domestic energy supply of the U.S. The major goal for the first year is to develop a reserve growth factor for the entire U.S. based on the proprietary Department of Energy-Energy Information Administration's Oil and Gas Integrated Field File (OGIFF). Following the development, review, and publication of the U.S. reserve growth assessment, we will begin topical and regional studies to determine the geologic and engineering parameters that control the magnitude of reserve growth. Many significant questions remain with respect to reserve growth- Do oil fields grow different than gas fields? Do heavy oil reservoirs grow different than conventional reservoirs? What is the magnitude of reserve growth from heavy oil reservoirs in the U.S.? Will we expect more growth from gas or oil reservoirs in the future? What volumes of oil and/or gas can be expected to be available for U.S. supply from reserve growth? What are the main economic controls on reserve growth? These are some of the main issues facing studies of reserve growth.

Schedule of Work

The main goal for FY2001 is to understand the geologic, engineering, and economic controls on the growth of reserves in existing oil and gas fields in the U.S. The acquisition of the DOE OGIFF database this year allows us to conduct several critical investigations related to the development of regional and national growth estimates. We must review the quality of the new OGIFF database (five additional years of data: 1992-1996) for selected fields by comparing the reserves values with data from other in-house oil and gas databases, including NRG and Petroleum Information/Dwights Corp. OGIFF and NRG databases are then independently used to obtain proven reserves of fields. We will establish whether reserve growth functions will change as a result of these new data, and we will analyze the potential use of incremental growth functions for each decade.

TASK 3: Petroleum Systems and Assessment of the Greater Green River Basin

Task Leader: Mark Kirschbaum

Task Summary and Objectives:

The overall goal of the Green River Basin task is to geologically define total petroleum systems, define gas plays, and assess the total natural gas endowment of the Greater Green River Basin by October 2002. The task will assess all gas resources, including conventional gas, continuous gas, and coal bed gas, as well as assess reserve growth in existing gas fields. For FY2001, the task is focusing on defining total petroleum systems, organizing existing geologic data pertinent to total petroleum systems, and conducting framework geologic studies that will aid in the definition of systems and gas plays. The primary objectives of this task are to 1) define total petroleum systems in the basins, 2) geologically characterize the total petroleum systems, 3) define conventional, continuous, and coal bed gas plays, and 4) conduct assessments of gas plays in collaboration with the methodology team. The strategy is to first organize and interpret the extensive geologic and geochemical data for the Greater Green River Basin, and focus new research on those aspects of total petroleum systems that require additional work. All assessments will be a collaborative effort between the regional experts and the methodology team.

Schedule of Work:

The goal for FY2001 is to work as a team to define total petroleum systems and assessment plays using data presently available. Petroleum systems and plays will be defined and reviewed in FY01, and an informal Green River Basin Core Workshop will be held in September of 2001. The assessment of plays will occur in October, 2002. All geologic documentation and petroleum system papers are to be completed by the mid-year FY03.

TASK 4: Petroleum Systems and Assessment of the Appalachian Basin

Task Leader: Robert Milici

Task Summary and Objectives

The purpose of this task is to define total petroleum systems and assessment units and assess the undiscovered hydrocarbon resource potential of the Appalachian Basin and the Warrior Basin. The task involves reorganizing existing data and developing new data on Appalachian oil and gas, including coal bed gas assessment units. The assessment will include all gas resources- conventional,

continuous, and coal bed gas. As a first approach to the problem, we are using USGS plays from the 1995 assessment and the recently published Appalachian Gas Atlas (AGA), both of which are organized on a play basis, for a preliminary definition of total petroleum systems and assessment units. Total petroleum systems are defined by geochemical properties of hydrocarbons, source rock quality, thermal maturation, and hydrocarbon generation, migration, and entrapment.

Schedule of Work

The main goal for FY2001 is to complete the geologic definition of total petroleum systems and associated assessment units in the Appalachian Basin and Warrior Basin, and complete the assessment of both basins in October, 2001

TASK 5: Petroleum Systems and Assessment of the San Juan Basin

Task Leader: Jennie Ridgley

Task Summary and Objectives

The overall goal of the San Juan Basin Task is to geologically define total petroleum systems, define gas plays, and assess the total natural gas endowment of the San Juan Basin. The project will assess all gas resources, including conventional gas, continuous gas, and coal bed gas, as well as assess reserve growth in existing gas fields. For FY2001, the project will focus on defining total petroleum systems, organizing existing geologic data pertinent to petroleum systems, and conducting framework geologic studies that will aid in the definition of systems and gas plays. The primary objectives of this project are to 1) define total petroleum systems in the basins, 2) geologically characterize the petroleum systems, 3) define conventional, continuous, and coal bed gas plays, continuous gas, and 4) conduct assessments of gas plays in collaboration with the methodology team. The strategy is to first organize and interpret the extensive geologic and geochemical data for the Uinta-Piceance, and focus new research on those aspects of systems that require additional work. All assessments will be a collaborative effort between the regional experts and the methodology team.

Schedule of Work

The goal for FY2001 is to work as a team to define total petroleum systems and assessment plays using data presently available. Total petroleum systems and plays will be defined and reviewed in FY01, and the assessment of plays will occur in October, 2002. All geologic documentation and petroleum system papers are to be completed by the mid-year of FY03.

TASK 6: Petroleum Systems and Assessment of the Permian Basin

Task Leader: Harry Cook

Task Summary and Objectives:

The overall goal of the Permian Basin Task is to geologically define total petroleum systems, define oil and gas plays, and assess the total oil and natural gas endowment of the Permian Basin by October 2003. The task will assess all oil and gas resources, including conventional gas, continuous gas, and coal bed gas, as well as assess reserve growth in existing oil and gas fields. For FY2001, the task is focusing on defining total petroleum systems, organizing existing geologic data pertinent to total petroleum systems, and conducting framework geologic studies that will aid in the definition of systems and gas plays. The primary objectives of this task are to 1) define total petroleum systems in the basins, 2) geologically characterize the total petroleum systems, 3) define conventional and continuous gas plays, and 4) conduct assessments of gas plays in collaboration with the methodology team. The strategy is to first organize and interpret the extensive geologic and geochemical data for the Permian Basin, and focus new research on those aspects of total petroleum systems that require additional work. All assessments will be a collaborative effort between the regional experts and the methodology team.

Schedule of Work:

The goal for FY2001 is to work as a team to define total petroleum systems and assessment plays using data presently available, and work closely with the Bureau of Economic Geology. Total petroleum systems and plays will be defined and reviewed in FY2001 and FY2002. The assessment of oil and gas plays will occur in October, 2003. All geologic documentation and petroleum system papers are to be completed by mid-year of FY2004.

TASK 7: Petroleum Systems and Assessment of the San Joaquin Basin

Task Leader: Donald Gautier

Task Summary and Objectives

The overall goal of the San Joaquin Basin Task is to geologically define total petroleum systems, define gas plays, and assess the total natural gas endowment of the San Joaquin Basin. The project will assess all gas resources, including conventional gas and continuous gas, as well as assess reserve growth in existing gas fields. For FY2001 and FY2002, the project will focus on defining total petroleum systems, organizing existing geologic data pertinent to petroleum systems, and conducting framework geologic studies that will aid in the definition of systems and gas plays. The primary objectives of this project are to 1) define petroleum systems in the basins, 2) geologically characterize the petroleum systems, 3) define conventional and continuous gas, and 4) conduct assessments of gas plays in collaboration with the methodology team. The strategy is to first organize and interpret the extensive geologic and geochemical data for the San Joaquin, and focus new research on those aspects of systems that require additional work. All assessments will be a collaborative effort between the regional experts and the methodology team.

Schedule of Work

The goal for FY2001 and FY2002 is to work as a team to define total petroleum systems and assessment plays, and establish a cooperative working agreement with other organizations working on the San Joaquin Basin. Total petroleum systems and plays will be defined and reviewed in FY2001 and FY2002, and the assessment of plays will occur in October, 2003. All geologic documentation and petroleum system papers are to be completed by mid-year of FY04.

TASK 8: Petroleum Systems and Basin Modeling

Task Leader: Dan Hayba

Task Summary and Objectives

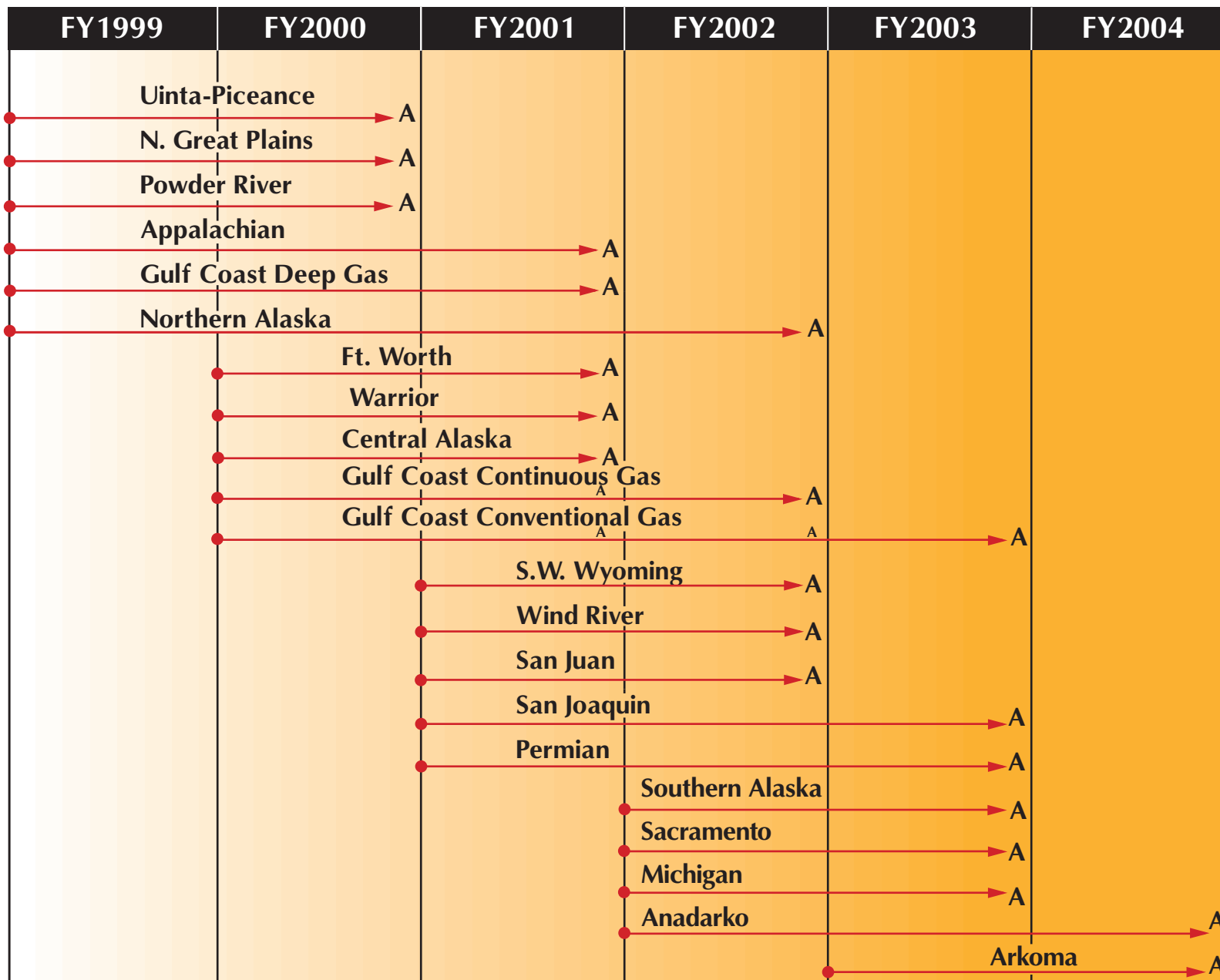
The goal of this Modeling Task is to coordinate and focus the scientific efforts of those working on fluid flow modeling of priority U.S. basins for the National Oil and Gas Assessment. The overall scientific objective is to model the thermal and fluid-flow history of several priority basins with the goal of defining the potential fluid types and migration pathways of hydrocarbon fluids within total petroleum systems.

Schedule of Work

Fluid-flow modeling is underway in the Appalachian Basin and the San Joaquin Basin with the goal of utilizing this information in the assessment of undiscovered hydrocarbon resources.



National Assessment Schedule



A = Assessments in Fall

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